

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 31

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte RIICHI KATOH, TETSUFUMI TANAMOTO, FRANCIS M. SABA,
YUJIRO NARUSE, SHIGEKI TAKAHASHI and MASAO MASHITA

Appeal No. 1999-0862
Application 08/764,275

HEARD: May 24, 2001

Before FLEMING, LALL, and BARRY, **Administrative Patent Judges.**

FLEMING, **Administrative Patent Judge.**

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1 through 16, all claims pending in the present application.

The invention relates to a quantum effect device which

utilizes a quantum effect such as tunnel effect.

Independent claim 1 is reproduced as follows:

1. A quantum effect device comprising a plurality of cells, including an input cell and an output cell, wherein each of said quantum cells takes one of at least two recognizable states in accordance with a physical interaction between the quantum cell and any adjacent quantum cell and said quantum cells are arranged in such a two-dimensional pattern that the input cell and the output cell have a predetermined relation and that the output cell and some other cells constitute a loop structure.

The Examiner has not relied on any prior art in the rejection of the claims under appeal.

Claims 1 through 16 stand rejected under 35 U.S.C. § 112, first paragraph, for failing to provide an adequate enabling disclosure of the claimed invention.

Rather than reiterate all the arguments by the Appellants and the Examiner, reference is made to the briefs¹ and answer

¹ The record is not clear as to when Appellants filed an appeal brief. We note that the appeal brief is present in the file; however, the contents of the file do not list the appeal brief. We suggest the Examiner clarify the file as to when the appeal brief was actually filed. Appellants filed a reply brief on September 21, 1998. The Examiner mailed an office communication on September 30, 1998, stating that the reply brief has been entered and considered but no further response

for the respective details thereof.

OPINION

We will not sustain the rejection of claims 1 through 16 under 35 U.S.C. § 112, first paragraph.

The Examiner argues that Appellants' disclosure fails to teach how to place an exact number of donors atoms in precise locations. More specifically, the Examiner argues that appellants' disclosure fails to provide an enabling disclosure of how to align singular atoms in a two-dimensional plane with individually closely packed spaces located under the intervening layers.

On page 5 of the brief, Appellants argue that they have clearly established on the record that one of ordinary skill in the art would know how to make and/or use the invention given the originally filed disclosure, and that thus the original disclosure is enabling. Appellants point to the

by the Examiner is deemed necessary.

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declaration by Dr. Lent under 37 CFR § 1.132 filed with the response of August 15, 1997. Appellants argue that the declaration establishes that prior to the date of the present application it was known to those of ordinary skill in the art that the occupancy of electrons in individual Quantum Cellular Automata cells was controlled energetically, and that one way to achieve placing two electrons in such cells is that a top gate shift of energy of a cell state to an appropriate Fermi level as shown in figure 2 of the article "Quantum Cellular Automata: The Physics of Computing With the Raise of Quantum Dot Molecules." Appellants argue that this article discloses that the quantum interaction separates different charge states of a Quantum Cellular Automata cell. Appellants further argue that the filed declaration also indicates that it was known to those of ordinary skill in the art that if a Fermi level is positioned between a two-electron level and a three-electron level, then Quantum Cellular Automata cell will have two electrons in them.

As noted by our reviewing court in **Enzo Biochem, Inc. v. Calgene Inc.**, 188 F.3d 1362, 1371, 52 USPQ2d 1129, 1135 (Fed.

Cir. 1999):

"[t]he statutory basis for the enablement requirement is found in Section 112, Para. 1, which provides relevant part that:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same

35 U.S.C. § 112, Para. 1 (1994)."

"To be enabling, the specification of a patent must teach those skilled in the art how to make and use the full scope of the claimed invention without 'undue experimentation'."

Genentech, Inc. v. Novo Nordisk, A/S 108 F.3d 1361, 1365, 42 USPQ2d 1001, 1004 (Fed. Cir. 1997) (quoting **In re Wright**, 999 F.2d 1557, 1561, 27 USPQ2d 1510, 1513 (Fed. Cir. 1993)).

Whether claims are sufficiently enabled by a disclosure in a specification is determined as of the date that the patent application was first filed, **see Hybritech, Inc. v. Monoclonal Antibodies, Inc.**, 802 F.2d 1367, 1384, 231 USPQ 81, 94 (Fed. Cir. 1986). We have held that a patent specification complies with the statute even if a "reasonable" amount of routine experimentation is required in order to practice a claimed

invention, but that such experimentation must not be "undue."
See, e.g., In re Wands, 858 F.2d 731, 736-37, 8 USPQ2d 1400,
1404 (Fed. Cir. 1988) ("Enablement is not precluded by the
necessity for some experimentation However,
experimentation needed to practice the invention must not be
undue experimentation. The key word is 'undue,' not
'experimentation'.") (footnotes, citations, and internal
quotation marks omitted). In **Wands**, we set forth a number of
factors which a court may consider in determining whether a
disclosure would require undue experimentation. These factors
were set forth as follows:

(1) the quantity of experimentation necessary, (2) the amount
of direction or guidance presented, (3) the presence or
absence of working examples, (4) the nature of the invention,
(5) the state of the prior art, (6) the relative skill of
those in the art, (7) the predictability or unpredictability
of the art, and (8) the breadth of the claims.

Id. at 737, 8 USPQ2d at 1404. We have also noted that

all of the factors need not be reviewed when determining whether a disclosure is enabling. **See, Amgen, Inc. v. Chugai Pharm. Co., Ltd.**, 927 F.2d 1200, 1213, 18 USPQ2d 1016, 1027 (Fed. Cir. 1991) (noting that the **Wands** factors "are illustrative, not mandatory. What is relevant depends on the facts.").

First, we must first understand what the Appellants have invented. On pages 1 through 3 of the specification, Appellants point out that it was known to provide quantum cells as shown in figures 18a and 18b. Appellants point out that the arrangement of the cells of 18a and 18b provides a drawback that it will not properly operate if the input is a zero as shown in figure 18b and therefore does not properly operate as an inverter. Appellants disclose on pages 22 through 26 that figure 1a is the first embodiment of the invention which overcomes the prior art problems. Appellants have arranged the quantum cells C1 through

C4 in a two-dimensional pattern that constitutes a loop

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structure. Appellants provide numerous other environments in embodiments having to do with the arrangement of the quantum cells. Thus, the Appellants are not claiming that they have invented quantum cells and have, in fact, acknowledged that quantum cells were known at the time of the filing of the application.

This is supported by the declaration by Dr. Lent as well as the numerous articles that were provided by the Appellants. In particular, we note that the article "Bistable Saturation in coupled quantum dots for quantum cellular automata", authored by Craig S. Lent, P. Douglas Tougaw and Wolfgang Porod published 23 November 1992, supports that quantum cells were known prior to the filing of this application. In particular, we point to figure 1 of that article that shows such a quantum cell. We acknowledge that the Examiner has pointed to portions of these articles that state that this technology has its difficulties. However, we find nothing in the articles that support the Examiner's argument that one of ordinary skill in the art would not be able to make or use the Appellants' invention without routine experimentation.

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For these reasons, the rejection of claims 1 through 16
under 35 U.S.C. § 112, first paragraph, will not be sustained.

REVERSED

MICHAEL R. FLEMING)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
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